

WHAT IS CLAIMED IS:

1. A motion controlled handheld device comprising:
 - a first accelerometer operable to detect acceleration along a first axis;
 - a second accelerometer operable to detect acceleration along a second axis, the
 - 5 second axis perpendicular to the first axis;
 - a tilt detection component operable to detect rotation having a component around at least one of the first axis and the second axis;
 - a display operable to present a current image;
 - a motion tracking module operable to track motion of the device in three
 - 10 dimensions using the first accelerometer, the second accelerometer, and the tilt detection component; and
 - a controller operable to generate the current image and to modify the current image in response to the motion of the device.
- 15 2. The motion controlled handheld device of Claim 1, wherein:
 - the display comprises a viewable surface; and
 - the first axis and the second axis are substantially parallel to the viewable surface.
- 20 3. The motion controlled handheld device of Claim 1, wherein:
 - the tilt detection component comprises a third accelerometer operable to detect acceleration along a third axis, the third axis perpendicular to the first axis and perpendicular to the second axis; and wherein:
 - the motion tracking module is further operable to distinguish translation within
 - 25 a plane formed by the first axis and the second axis from rotation having a component around at least one of the first axis and the second axis based upon the acceleration measured by the third accelerometer.

4. The motion controlled handheld device of Claim 1, wherein the tilt detection component comprises:

a third accelerometer operable to detect acceleration along a third axis, the third axis perpendicular to the first axis and perpendicular to the second axis;

5 a camera operable to generate a video stream; and

a video analysis module operable to detect a direction of motion based on the video stream.

5. The motion controlled handheld device of Claim 4, wherein the tilt
10 detection component further comprises:

a range finder operable to determine distance information including a distance between the device and an object in the video stream; and wherein:

the video analysis module is further operable to determine a magnitude of translation of the device using the distance.

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6. The motion controlled handheld device of Claim 1, wherein the tilt detection component comprises:

a first camera operable to generate a first video stream, the first camera aligned to focus in a first direction along a third axis, the third axis perpendicular to
20 the first axis and perpendicular to the second axis;

a second camera operable to generate a second video stream, the second camera aligned to focus in a second direction along the third axis, the second direction opposite the first direction; and

a video analysis module operable to detect a direction of motion of the device
25 based on the first video stream and the second video stream.

7. The motion controlled handheld device of Claim 6, wherein the tilt detection component further comprises a third accelerometer operable to detect acceleration along the third axis.

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8. The motion controlled handheld device of Claim 6, wherein the video analysis module is further operable to:

detect first edges of objects in the first video stream;

detect second edges of objects in the second video stream;

5 identify movement of the first edges and the second edges;

determine a differential between the movement of the first edges and the movement of the second edges; and

determine tilt components and translation components based on the differential.

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9. The motion controlled handheld device of Claim 1, further comprising:

a gesture database comprising a plurality of gestures, each gesture defined by a motion of the device with respect to a first position of the device; and

15 a gesture mapping database mapping each of the gestures to a corresponding command; and wherein

the controller is further operable to compare the tracked motion of the device against the gestures to determine a received gesture, to identify the corresponding command mapped to the received gesture, and to execute the identified command to modify the current image.

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10. The motion controlled handheld device of Claim 1, wherein:

the motion tracking module is further operable to identify translation of the device within a plane formed by the first axis and the second axis based upon motion of the device;

25 the current image displays a subsection of a larger image; and

the controller is further operable to continuously modify the current image to display another subsection of the larger image based on a resulting position of the device resulting from the translation.

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11. The motion controlled handheld device of Claim 1, wherein the motion tracking module is further operable to disregard acceleration detected by the first

accelerometer and acceleration detected by the second accelerometer that register below a noise threshold.

12. A method for controlling a handheld device comprising:
detecting acceleration along a first axis using a first accelerometer;
detecting acceleration along a second axis using a second accelerometer, the
second axis perpendicular to the first axis;
5 detecting rotation having a component around at least one of the first axis and
the second axis using a tilt detection component;
tracking motion of the device in three dimensions using the first
accelerometer, the second accelerometer, and the tilt detection component; and
displaying a current image using a display of the device and modifying the
10 current image in response to the tracked motion of the device.

13. The method of Claim 12, wherein:
the display comprises a viewable surface; and
the first axis and the second axis are substantially parallel to the viewable
15 surface.

14. The method of Claim 12, further comprising:
detecting acceleration along a third axis using a third accelerometer of the tilt
detection component, the third axis perpendicular to the first axis and perpendicular to
20 the second axis; and
distinguishing translation within a plane formed by the first axis and the
second axis from rotation having a component around at least one of the first axis and
the second axis based upon the acceleration measured by the third accelerometer.

25 15. The method of Claim 12, further comprising:
detecting acceleration along a third axis using a third accelerometer of the tilt
detection component, the third axis perpendicular to the first axis and perpendicular to
the second axis; and
monitoring a video stream generated by a camera of the device; and
30 detecting a direction of motion based on the video stream.

16. The method of Claim 15, further comprising:
determining distance information including a distance between the device and
an object in the video stream; and
determining a magnitude of translation of the device using the distance.

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17. The method of Claim 12, further comprising:
monitoring a first video stream generated by a first camera of the device, the
first camera aligned to focus in a first direction along a third axis, the third axis
perpendicular to the first axis and perpendicular to the second axis;
10 monitoring a second video stream generated by a second camera of the device,
the second camera aligned to focus in a second direction along the third axis, the
second direction opposite the first direction; and
detecting a direction of motion of the device based on the first video stream
and the second video stream.

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18. The method of Claim 17, further comprising:
detecting first edges of objects in the first video stream;
detecting second edges of objects in the second video stream;
identifying movement of the first edges and the second edges;
20 determining a differential between the movement of the first edges and the
movement of the second edges; and
determining tilt components and translation components based on the
differential.

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19. The method of Claim 12, further comprising:
comparing the tracked motion of the device against a gesture database, the
gesture database comprising a plurality of gestures with each gesture defined by a
motion of the device with respect to a first position of the device;
identifying a command mapped to the received gesture; and
30 executing the identified command to modify the current image.

20. Logic for controlling a handheld device, the logic embodied in a computer readable medium and operable when executed to perform the steps of:

detecting acceleration along a first axis using a first accelerometer;

5 detecting acceleration along a second axis using a second accelerometer, the second axis perpendicular to the first axis;

detecting rotation having a component around at least one of the first axis and the second axis using a tilt detection component;

tracking motion of the device in three dimensions using the first accelerometer, the second accelerometer, and the tilt detection component; and

10 displaying a current image using a display of the device and modifying the current image in response to the tracked motion of the device.

21. The logic of Claim 20, further operable when executed to perform the steps of:

15 detecting acceleration along a third axis using a third accelerometer of the tilt detection component, the third axis perpendicular to the first axis and perpendicular to the second axis; and

distinguishing translation within a plane formed by the first axis and the second axis from rotation having a component around at least one of the first axis and
20 the second axis based upon the acceleration measured by the third accelerometer.

22. The logic of Claim 20, further operable when executed to perform the steps of:

25 detecting acceleration along a third axis using a third accelerometer of the tilt detection component, the third axis perpendicular to the first axis and perpendicular to the second axis; and

monitoring a video stream generated by a camera of the device; and

detecting a direction of motion based on the video stream.

23. The logic of Claim 20, further operable when executed to perform the steps of:

determining distance information including a distance between the device and an object in the video stream; and

5 determining a magnitude of translation of the device using the distance.

24. The logic of Claim 20, further operable when executed to perform the steps of:

10 monitoring a first video stream generated by a first camera of the device, the first camera aligned to focus in a first direction along a third axis, the third axis perpendicular to the first axis and perpendicular to the second axis;

monitoring a second video stream generated by a second camera of the device, the second camera aligned to focus in a second direction along the third axis, the second direction opposite the first direction; and

15 detecting a direction of motion of the device based on the first video stream and the second video stream.

25. The logic of Claim 24, further operable when executed to perform the steps of:

20 detecting first edges of objects in the first video stream;

detecting second edges of objects in the second video stream;

identifying movement of the first edges and the second edges;

determining a differential between the movement of the first edges and the movement of the second edges; and

25 determining tilt components and translation components based on the differential.

26. The logic of Claim 20, further operable when executed to perform the steps of:

30 comparing the tracked motion of the device against a gesture database, the gesture database comprising a plurality of gestures with each gesture defined by a motion of the device with respect to a first position of the device;

identifying a command mapped to the received gesture; and
executing the identified command to modify the current image.

27. A motion controlled handheld device comprising:
- means for detecting acceleration along a first axis;
 - means for detecting acceleration along a second axis, the second axis perpendicular to the first axis;
 - 5 means for detecting rotation having a component around at least one of the first axis and the second axis;
 - means for tracking motion of the device in three dimensions based upon the acceleration along the first axis, the acceleration along the second axis, and the rotation; and
 - 10 means for displaying a current image using a display of the device and modifying the current image in response to the tracked motion of the device.